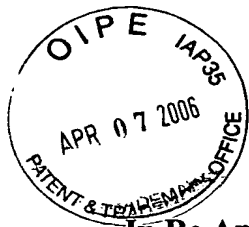


IFW

DOCKET NO.: RUCC-0064/04-053

PATENT



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Daphne Havkin-Frenkel, et al.

Confirmation No.: 1631

Application No.: 10/532,464

Group Art Unit: Not Yet Assigned

Filing Date: November 7, 2005

Examiner: Not Yet Assigned

For: PRODUCTION OF VANILLIN IN MICROBIAL CELLS

DATE OF DEPOSIT:

April 4, 2006

I HEREBY CERTIFY THAT THIS PAPER IS BEING DEPOSITED WITH THE UNITED STATES POSTAL SERVICE AS FIRST CLASS MAIL, POSTAGE PREPAID, ON THE DATE INDICATED ABOVE AND IS ADDRESSED TO THE UNITED STATES PATENT AND TRADEMARK OFFICE, P.O. BOX 1450, ALEXANDRIA, VA 22313-1450.

Elizabeth A. McLoud

TYPED NAME: Elizabeth A. McLoud

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

INFORMATION DISCLOSURE STATEMENT

Pursuant to 37 CFR § 1.56 and in accordance with 37 CFR §§ 1.97-1.98, information relating to the above-identified application is hereby disclosed. Inclusion of information in this statement is not to be construed as an admission that this information is material as that term is defined in 37 CFR § 1.56(b).



In accordance with § 1.97(b), since this Information Disclosure Statement is being filed either within three months of the filing date of the above-identified application, within three months of the date of entry into the national stage of

the above identified application as set forth in § 1.491, before the mailing date of a first Office Action on the merits of the above-identified application, or before the mailing date of a first Office Action after the filing of request for continued examination under § 1.114, no additional fee is required.

- ☐ In accordance with § 1.97(c), this Information Disclosure Statement is being filed after the period set forth in § 1.97(b) above but before the mailing date of either a Final Action under § 1.116 or a Notice of Allowance under § 1.311, or before an action that otherwise closes prosecution in the application, therefore:

- ☐ Certification in Accordance with § 1.97(e) is attached; or
- ☐ The fee of \$180.00 as set forth in § 1.17(p) is attached.

- ☐ In accordance with § 1.97(d), this Information Disclosure Statement is being filed after the mailing date of either a Final Action under § 1.113 or a Notice of Allowance under § 1.311 but before, or simultaneously with, the payment of the Issue Fee, therefore included are: Certification in Accordance with § 1.97(e); and the submission fee of \$180.00 as set forth in § 1.17(p).

- ☒ Copies of reference numbers **1 - 54** listed on the attached Form PTO-1449 are enclosed herewith.

- ☒ A copy of reference number **55** on the attached Form PTO 1449 is not required to be submitted pursuant to 37 CFR § 1.98(a)(2)(i).

- ☐ Copies of references - are not being submitted because they were previously cited by or submitted to the U.S. Patent and Trademark Office in patent application number , filed for which a claim for priority under 35 U.S.C. § 120 has been made in the instant application.

☐ The relevance of those listed references which are not in the English language is as follows:

There are no listed references which are not in the English language.

Please charge any deficiency or credit any overpayment to Deposit Account No. 23-3050. This form is submitted in duplicate.

Date:

April 3, 2006


Janet E. Reed

Registration No. 36,252

WOODCOCK WASHBURN LLP
One Liberty Place - 46th Floor
Philadelphia, PA 19103
Telephone: (215) 568-3100
Facsimile: (215) 568-3439



Form PTO-1449 Modified List of Patent and Publications Cited by Applicant (Use several sheets if necessary) U.S. Department of Commerce Patent and Trademark Office	Docket No. RUCC-0064/ 04-053	Application No. 10/532,464
	Applicant Daphne Havkin-Frenkel, et al.	
	Filing Date November 7, 2005	Group Not Yet Assigned
	Confirmation No. 1631	
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)		
1	Attieh, J.M., et al., "Purification and characterization of a novel methyltransferase responsible for biosynthesis of halomethanes and methanethiol in <i>Brassica oleracea</i> ," <i>J. Biol. Chem.</i> , 1995 , 270, 9250-9257	
2	Auh, C.-K., et al., "Structure and expression of caffeic acid O-methyltransferase cDNAs from tall fescue (<i>Festuca arundinacea</i>)," unpublished, GenBank No. AF153825, http://www.ncbi.nlm.nih.gov , downloaded July 22, 2005 (Abstract 2 pages)	
3	Benz, "Biotechnological production of vanillin," <i>Flavour Science – Recent Development</i> , Taylor, A.J., et al. (Eds.), <i>The Royal Soc. Of Chem., Cambridge, UK</i> , 1996 , 111-117	
4	Bout, S., et al., "A candidate-gene approach to clone the sorghum Brown midrib gene encoding caffeic acid O-methyltransferase," <i>Mol. Genet. Genomics</i> , 2003 , 269(2), 205-214, GenBank No. AY217766 (Abstract 3 pages)	
5	Bugos, R.C., et al., "cDNA cloning, sequence analysis and seasonal expression of lignin-bispecific caffeic acid/5-hydroxyferulic acid O-methyltransferase of aspen," <i>Plant Mol. Biol.</i> , 1991 , 17(6), 1203-1215, GenBank No. X62096 (Abstract 2 pages)	
6	Campa, C., et al., "Complete sequence of a coffea canephora leaf caffeic acid O-methyltransferase cDNA," unpublished, GenBank No. AF454631, http://www.ncbi.nlm.nih.gov , downloaded July 22, 2005 , (Abstract 2 pages)	
7	Civolani, C., et al., "Bioconversion of ferulic acid into vanillic acid by means of a vanillate-negative mutant of <i>Pseudomonas fluorescens</i> strain BF13," <i>Appl. Environ. Microbiol.</i> , 2000 , 66(6), 2311-2317	
8	Collazo, P., et al., "Structure and expression of the lignin O-methyltransferase gene from zea mays L," <i>Plant Mol. Biol.</i> , 1992 , 20(5), 857-867, GenBank No. M73235 (Abstract 2 pages)	
9	Dignum, M.J., et al., "Vanilla production: technological, chemical, and biosynthetic aspects," <i>Food Rev. Int.</i> , 2001 , 17(2), 199-219	
10	Frick, S., et al., "Molecular cloning and functional expression of O-methyltransferases common to isoquinoline alkaloid and phenylpropanoid biosynthesis," <i>Plant J.</i> , 1999 , 17(4), 329-339, GenBank No. AF064696 (Abstract 2 pages)	
EXAMINER		DATE CONSIDERED

Form PTO-1449 Modified List of Patent and Publications Cited by Applicant (Use several sheets if necessary) U.S. Department of Commerce Patent and Trademark Office	Docket No. RUCC-0064/ 04-053	Application No. 10/532,464
	Applicant Daphne Havkin-Frenkel, et al.	
	Filing Date November 7, 2005	Group Not Yet Assigned
	Confirmation No. 1631	
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)		
11	Gasson, M.J., et al., "Metabolism of ferulic acid to vanillin," <i>J. Biol. Chem.</i> , 1998 , 273(7), 4163-4170	
12	Gowri, G., et al., "Molecular cloning and expression of alfalfa S-adenosyl-L-methionine: caffeic acid 3-O-methyltransferase, a key enzyme of lignin biosynthesis," <i>Plant Physiol.</i> , 1991 , 97, 7-14, GenBank No. M63853 (Abstract 2 pages)	
13	Gross, H.J., et al., "Temperature-dependent inactivation of tRNA ^{Tyr E. coli} acceptor function with iodine: influence of the 3'-terminal pCpA sequence," <i>FEBS Lett.</i> , 1973 , 30(3), 347-350	
14	Guo, D., et al., "Downregulation of caffeic acid 3-O-methyltransferase and caffeoyl CoA 3-O-methyltransferase in transgenic alfalfa: impacts on lignin structure and implications for the biosynthesis of G and S lignin," <i>Plant Cell</i> , 2001 , 13, 73-88	
15	Havkin-Frenkel, D.H., et al., "Vanilla," <u>Spices: Flavor Chemistry and Antioxidant Properties</u> , Risch, et al. (Eds.), <i>Am. Chem. Soc.</i> , 1997 , Chapter 4, 29-40	
16	Havkin-Frenkel, D., et al., "Effect of light on vanillin precursors formation by <i>in vitro</i> cultures of <i>Vanilla planifolia</i> ," <i>Plant Cell, Tissue & Organ Culture</i> , 1996 , 46, 169-170	
17	Havkin-Frenkel, D., et al., "Vanillin biosynthetic pathways," <u>Plant Cell and Tissue Culture for the Production of Food Ingredients</u> , Fu, T.J., et al. (Eds.), <i>Kluwer Acad. Press/Plenum Publishers, NY</i> , 1997 , Chapter 4, 35-43	
18	Havkin-Frenkel, D., et al., "Effect of light on vanillin precursors formation by <i>in vitro</i> cultures of <i>Vanilla planifolia</i> ," <i>Plant Cell Tiss. Org. Cult.</i> , 1996 , 45, 133-136	
19	Jaek, E., et al., "Expression of class I O-methyltransferase in healthy and TMV-infected tobacco," <i>Mol. Plant Microbe Interact.</i> , 1996, 9(8), 681-688, GenBank No. X74452 (Abstract 2 pages)	
20	Jang, C.S., et al., "Differential expression of genes induced by larval infestation of Hessian fly in wheat-rye translocation lines carrying 2RL," unpublished, GenBank No. AY226581, http://www.ncbi.nlm.nih.gov , downloaded July 22, 2005 (Abstract 2 pages)	
EXAMINER		DATE CONSIDERED

Form PTO-1449 Modified List of Patent and Publications Cited by Applicant (Use several sheets if necessary) U.S. Department of Commerce Patent and Trademark Office		Docket No. RUCC-0064/ 04-053	Application No. 10/532,464
		Applicant Daphne Havkin-Frenkel, et al.	
		Filing Date November 7, 2005	Group Not Yet Assigned
		Confirmation No. 1631	
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)			
	21	Klinke, H.B., et al., "Characterization of degradation products from alkaline wet oxidation of wheat straw," <i>Bioresource Techn.</i> , 2002 , 82(1), 15-26	
	22	Lee, J.E., et al., "Genomic sequence and mapping of a methyljasmonate-induced O-methyltransferase from barley (<i>Hordeum vulgare</i> L.)," <i>DNA Seq.</i> , 1997 , 7(6), 357-363, GenBank No. U54767 (Abstract 3 pages)	
	23	Li, T., et al., "Biocatalytic synthesis of vanillin," <i>Appl. & Environ. Microbiol.</i> , 2000 , 66(2), 684-687	
	24	Löscher, R., et al., "Biosynthesis of <i>p</i> -hydroxybenzoate from <i>p</i> -coumarate and <i>p</i> -coumaroyl-coenzyme A in cell-free extracts of <i>lithospermum erythrorhizon</i> cell cultures," <i>Plant Physiol.</i> , 1994 , 106, 271-279	
	25	Maury, S., et al., "Tobacco O-methyltransferases involved in phenylpropanoid metabolism. The different caffeoyl-coenzyme A/5-hydroxyferuloyl-coenzyme A 3/5-O-methyltransferase and caffeic acid/5-hydroxyferulic acid 3/5-O-methyltransferase classes have distinct substrate specificities and expression patterns," <i>Plant Physiol.</i> , 1999 , 121, 215-223	
	26	McAlister, F.E., et al., "Sequence and expression of a stem-abundant caffeic acid O-methyltransferase cDNA from perennial ryegrass (<i>Lolium perenne</i>)," <i>Aust. J. Plant Physiol.</i> , 1998 , 25, 225-235, GenBank No. AF010291 (Abstract 2 pages)	
	27	Micalek, W., et al., "EST sequencing and analysis in barley," unpublished, 2000 , GenBank No. AL505122, http://www.ncbi.nlm.nih.gov , downloaded July 22, 2005 (Abstract 2 pages)	
	28	Michalek, W., et al., "EST sequencing and analysis in barley," unpublished, 2000 , GenBank No. AL504589, http://www.ncbi.nlm.nih.gov , downloaded July 22, 2005 (Abstract 2 pages)	
	29	Narbad, A., et al., "Metabolism of ferulic acid via vanillin using a novel CoA-dependent pathway in a newly-isolated strain of <i>Pseudomonas fluorescens</i> ," <i>Microbiology</i> , 1998 , 144, 1397-1405	
	30	Nüsslein, B., et al., "Enzymatic degradation of cichoric acid in <i>Echinacea purpurea</i> preparations," <i>J. Nat. Prod.</i> , 2000 , 63, 1615-1618 (Abstract, 1 page)	
EXAMINER		DATE CONSIDERED	

Form PTO-1449 Modified List of Patent and Publications Cited by Applicant (Use several sheets if necessary) U.S. Department of Commerce Patent and Trademark Office		Docket No. RUCC-0064/ 04-053	Application No. 10/532,464
		Applicant Daphne Havkin-Frenkel, et al.	
		Filing Date November 7, 2005	Group Not Yet Assigned
		Confirmation No. 1631	
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)			
	31	Overhage, J., et al., "Biochemical and genetic analyses of ferulic acid catabolism in <i>pseudomonas</i> sp. Strain HR199," <i>Appl. Environ. Microbiol.</i> , 1999 , 65(11), 4837-4847	
	32	Overhage, J., et al., "Biotransformation of eugenol to vanillin by a mutant of <i>Pseudomonas</i> sp. Strain HR199 constructed by disruption of the vanillin dehydrogenase (vdh) gene," <i>Appl. Microbiol. Biotechnol.</i> , 1999 , 52(6), 820-828 (Abstract, 2 pages)	
	33	Pak, F.E., et al., "Characterization of a multifunctional methyltransferase from the orchid <i>Vanilla planifolia</i> ," <i>Plant Cell Rep.</i> , 2004 , 22, 959-966	
	34	Parvathi, K., et al., "Substrate preferences of O-methyltransferases in alfalfa suggest new pathways for 3-O-methylation of monolignols," <i>Plant J.</i> , 2001 , 25(2), 193-202 (Abstract, 2 pages)	
	35	Pellegrini, L., et al., "Molecular cloning and expression of a new class of ortho-diphenol-O-methyltransferases induced in tobacco (<i>nicotiana tabacum</i> L.) leaves by infection or elicitor treatment," <i>Plant Physiol.</i> , 1993 , 103, 509-517	
	36	Podstolski, A., et al., "Unusual 4-hydroxybenzaldehyde synthase activity from tissue cultures of the vanilla orchid <i>vanilla planifolia</i> ," <i>Phytochemistry</i> , 2002 , 61(6), 611-620 (Abstract, 1 page)	
	37	Poeydomenge, O., et al., "A cDNA encoding S-adenosyl-L-methionine:caffeic acid 3-O-methyltransferase from <i>Eucalyptus</i> ," <i>Plant Physiol.</i> , 1994 , 105(2), 749-750, GenBank No. X74814 (Abstract 2 pages)	
	38	Priefert, H., et al., "Biotechnological production of vanillin," <i>Appl. Microbiol. Biotechnol.</i> , 2001 , 56(3-4), 296-314 (Abstract, 1 page)	
	39	Schroder, G., et al., "Predicting the substrates of cloned plant O-methyltransferases," <i>Phytochemistry</i> , 2002 , 59(1), 1-8, GenBank No. AY028439 (Abstract 2 pages)	
	40	Selman-Housein, G., et al., "Molecular cloning of cDNAs coding for tree sugarcane enzymes involved in lignification," <i>Plant Sci.</i> , 1999 , 143, 163-171, GeneBank No. AJ231133 (Abstract 2 pages)	
EXAMINER		DATE CONSIDERED	

Form PTO-1449 Modified List of Patent and Publications Cited by Applicant (Use several sheets if necessary) U.S. Department of Commerce Patent and Trademark Office	Docket No. RUCC-0064/ 04-053	Application No. 10/532,464
	Applicant Daphne Havkin-Frenkel, et al.	
	Filing Date November 7, 2005	Group Not Yet Assigned
	Confirmation No. 1631	
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)		
41	Sugimoto, M., et al., "A root-specific O-methyltransferase gene expressed in salt-tolerant barley," <i>Biosci. Biotechnol. Biochem.</i> , 2003 , 67(5), 966-972, GenBank No. AB086416 (Abstract 2 pages)	
42	Taylor, W.R., "The classification of amino acid conservation," <i>J. Theor. Biol.</i> , 1986 , 119(2), 205-218 (Abstract, 1 page)	
43	Venturi, V., et al., "Genetics of ferulic acid bioconversion to protocatechuic acid in plant-growth-promoting <i>pseudomonas putida</i> WCS358," <i>Microbiology</i> , 1998 , 144, 965-973	
44	Walton, N.J., et al., "Novel approaches to the biosynthesis of vanillin," <i>Curr. Op. Biotechnol.</i> , 2000 , 11, 490-496 (Abstract, 2 pages)	
45	Wang, J., et al., "Characterization of S-adenosyl-L-methionine \oplus iso)eugenol O-methyltransferase involved in floral scent production in <i>Clarkia breweri</i> ," <i>Arch. Biochem. Biophys.</i> , 1998 , 349(1), 153-160 (Abstract, 2 pages)	
46	Wang, J., et al., "Floral scent production in <i>Clarkia breweri</i> (Onagraceae)," <i>Plant Physiol.</i> , 1997 , 114, 213-221	
47	Wang, J., et al., "Nucleotide sequence of S-adenosyl-L-methionine: caffeic acid 3-O-methyltransferase from <i>Clarkia breweri</i> ," <i>Plant Physiol.</i> , 1997 , 114, 1567, GenBank No. AF006009 (Abstract 2 pages)	
48	Wang, J., et al., "Neucleotide sequences of two cDNAs encoding caffeic acid O-methyltransferases from sweet basil," <i>Plant Physiol.</i> , 1999 , 120(4), 1205, GenBank Nos. AF15417 and AF15418 (Abstract 2 pages)	
49	Williamson, G., et al., "Hairy plant polysaccharides: a close shave with microbial esterases," <i>Microbiology</i> , 1998 , 144, 2011-2023	
50	Wing, R., et al., "Development of a genetically and physically anchored EST resource for barley genomics: Morex rachis cDNA library," unpublished, 2001 , GenBank No. B1960224, http://www.ncbi.nlm.nih.gov , downloaded July 22, 2005 (Abstract 2 pages)	
EXAMINER		DATE CONSIDERED

Form PTO-1449 Modified List of Patent and Publications Cited by Applicant (Use several sheets if necessary) U.S. Department of Commerce Patent and Trademark Office		Docket No. RUCC-0064/ 04-053	Application No. 10/532,464
		Applicant Daphne Havkin-Frenkel, et al.	
		Filing Date November 7, 2005	Group Not Yet Assigned
		Confirmation No. 1631	
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)			
	51	Wing, R., et al., "Development of a genetically and physically anchored EST resource for barley genomics: Morex rachis cDNA library," unpublished, 2001 , GenBank No. B1960117, http://www.ncbi.nlm.nih.gov , downloaded July 22, 2005 (Abstract 2 pages)	
	52	Wing, R., et al., "Development of a genetically and physically anchored EST resource for barley genomics: Morex rachis cDNA library," unpublished, 2001 , GenBank No. B1957415, http://www.ncbi.nlm.nih.gov , downloaded July 22, 2005 (Abstract 2 pages)	
	53	Xue, Z.-T., et al., "Kinetin-induced caffeic acid <i>O</i> -methyltransferases in cell suspension cultures of <i>Vanilla planifolia</i> Andr. And isolation of caffeic acid <i>O</i> -methyltransferase cDNAs #," <i>Plant Physiol. Biochem.</i> , 1998 , 36(11), 779-788	
	54	Zubietta, C., et al., "Structural basis for the modulation of lignin monomer methylation of caffeic acid/5-hydroxyferulic acid 3/5- <i>O</i> -methyltransferase," <i>Plant Cell</i> , 2002 , 14, 1265-1277	
EXAMINER		DATE CONSIDERED	

Form PTO-1449 Modified

List of Patent and Publications
Cited by Applicant
(Use several sheets if necessary)

U.S. Department of Commerce
Patent and Trademark Office

Docket No.
RUCC-0064/
04-053

Application No.
10/532,464

Applicant
Daphne Havkin-Frenkel, et al.

Filing Date
November 7, 2005

Group
Not Yet Assigned

Confirmation No.
1631

U. S. PATENT DOCUMENTS

Examiner Initial		Document No.	Date	Name	Class	Subclass
	55	2003/0070188 A1	04/10/03	Havkin-Frenkel, et al.	800	278

FOREIGN PATENT DOCUMENTS

Examiner Initial		Document No.	Date	Country	Translation	
					YES	NO

EXAMINER**DATE CONSIDERED**